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Antioxidant Supplements and the Prevention of Heart Diseases: Hype or Hopes?

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Public interest in antioxidants has been growing rapidly over the last decade. The Internet lists over 65,000 sites on this subject, most of which are from companies or individuals selling antioxidant products, from vitamins to herbs, minerals, food extracts, etc. Antioxidants have been widely promoted as a preventive therapy for a wide range of conditions, including cardiovascular disease. Unfortunately, while there is ample evidence from basic research and observational studies to support the role of antioxidants in preventing heart disease, the results from clinical trials on humans have been discouraging. Before any prudent recommendation can be made, let's review some scientific evidence in this area, with emphasis on studies involving humans in real life situations.

What Leads To Heart Disease?

The majority of heart diseases arise from atherosclerosis, or the formation of plaque from fatty particles accumulated along the blood vessels wall. An acute heart attack occurs when this atherosclerotic plaque erodes and ruptures, leading to the build up of blood clots at the rupture site, a process called thrombosis. Numerous experimental studies have suggested that oxidation of LDL-cholesterol by free radicals plays a major role in the formation, progression, and rupture of these

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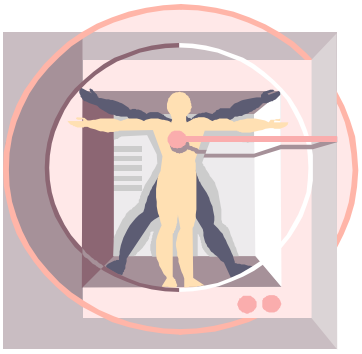

What Does Research Say About Effectiveness of Glucosamine and Chondroitin Sulfate Use in Osteoarthritis Sufferers?

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Arthritis affects 13% of Americans, with approximately half of adults over age 65 suffering from the disease (1). Osteoarthritis is the most common form of this disorder. Currently, there is no known cure for osteoarthritis. While there are some prescription and over-the-counter medications such as nonsteroidal anti-inflammatory drugs (NSAIDs) they may reduce symptoms associated with arthritis (e.g., pain), these medications may not be effective for all people. Many Americans are now seeking alternative treatments to help alleviate symptoms associated with chronic diseases (2). Two of the most popular dietary supplements being marketed for osteoarthritis are glucosamine sulfate and chondroitin sulfate. This article reviews scientific research regarding the effectiveness and safety of these dietary supplements.

A recent article published in the journal, *Rheumatic Disease Clinics of North America* summarized the scientific literature on the

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Antioxidant Supplements and the Prevention of Heart Diseases: Hype or Hopes? (Con't. from page 1)

plaques. Antioxidants, on the other hand, have the ability to inhibit oxidant formation, interfere with oxidant activities once they were formed, and even repair oxidant-induced injury. All of these findings, however, were from experiments done on animals at the molecular or cellular level in laboratories. How they apply to human subjects requires further examination.

Real Life Situations:

Several studies compared the past history of antioxidant intakes among people with and without heart disease. The outcomes of these studies have not been very consistent. The Nurses' Health Study, which surveyed 88,000 women over an 8-year period, showed that women who took the highest amount of Vitamin E for more than 2 years, both from diet and from supplements, had a much lower risk of heart disease compared to women who took lower amounts. The use of Vitamin C and ß-carotene supplements, on the other hand, did not lead to any benefit in heart disease prevention.

Extreme caution must be used in interpreting data from studies. For example, people who consume large amount of fruits and vegetables tend to have healthier living habits. Diets rich in antioxidants are also lower in saturated fat and cholesterol and higher in fiber. The low incidence of heart disease among these individuals could be the result of their overall life style, rather than from antioxidants alone.

Other studies, in contrast, showed that taking vitamin supplements might lead to potential harm. The ATBC (Alpha Tocopherol Beta Carotene Prevention) study showed an increased risk of hemorrhagic stroke in people taking Vitamin E supplements. ß-carotene had been shown in 2 different studies to increase the risk of heart disease, stroke, and mortality.

Discussion and Recommendation:

The notion that antioxidant supplements can prevent heart disease cannot be definitely proved or supported by current clinical evidence. Although scientific rationale and observational studies have been convincing, randomized clinical trials have failed to show a consistent benefit, some actually showed harmful effects of antioxidant supplements, especially ß-carotene, on human subjects. *(See table 1)*

There are many possible explanations for these discrepancies. First, the positive outcomes in the observational studies could be from the overall healthy life style rather from the oxidant supplements alone. Second, there may be also other types of nutrients in fruits and vegetables that act synergistically with antioxidants to provide the protective effect on the heart. Third, the amounts of antioxidants in the supplements may be too high compared to those in diets, leading to a potential toxicity effect. There might be other reasons that have not been postulated.

Antioxidants are not without potential side effects. High doses of Vitamin E could lead to hemorrhagic stroke. Long-term use of ß-carotene supplements could increase the risk of heart disease and cancer. The public should be cautioned about the excessive use of antioxidant supplements.

Moreover, people should be advised against the use of ß-carotene supplements, based on the overwhelming evidence that it may cause more harm than good. Until more definite scientific evidence is available regarding the efficacy, safety, and the appropriate dosage of antioxidants in heart disease, the most prudent recommendation for the general public is to get antioxidants from sources that have been clinically proven to be beneficial: whole grains, fruits, and vegetables.

References upon request.

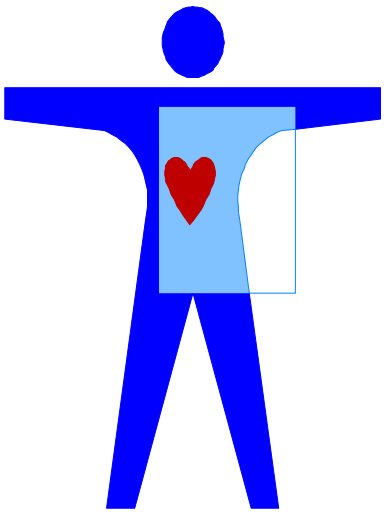

Table 1

ANTIOXIDANT	STUDY	OUTCOME
VITAMIN E	ATBC-Alpha Tocopherol Beta Carotene Prevention	(-) overall (↑ hemorrhagic stroke) (+) only in patients with heart disease
VITAMIN E	CLAS-Cholesterol Lowering Atherosclerosis Study	(+)
VITAMIN E	HOPE-Heart Outcome Prevention Evaluation	(0)
ß-CAROTENE	ATBC-Alpha Tocopherol Beta Carotene Prevention	(-) (↑ heart attack, cancer & mortality)
ß-CAROTENE	CARET-Beta-Carotene & Retinol Efficacy Trial	(-) (↑ heart attack, cancer & mortality
ß-CAROTENE	Physician's Health	(0)
VITAMIN C	Chinese Cancer Prevention	(0)
VITAMIN C	CLAS-Cholesterol Lowering Atherosclerosis Study	(0)
E+C+ ß-CAR	MVP-Multivitamins and Probucol Study	(0)
A+E+C+ ß-CAR	IEISS-The Indian Experiment of Infare Survival Study	(+) in patients with suspected heart attacks

Table 1: Randomized Clinical Trials on Antioxidants and the Prevention of Heart Disease: (+): beneficial effect; (-): harmful effect; (0): neutral effect

What Does Research Say About the Effectiveness of Glucosamine and Chondroitin Sulfate Use in Osteoarthritis Sufferers? (Con't from page 1)

effectiveness and safety of glucosamine and chondroitin sulfate for osteoarthritis (3). The journal article reviewed more than 20 placebo-controlled clinical trials on glucosamine sulfate and 7 clinical trials on/or standard treatments with NSAIDS (e.g., ibuprofen). Much of the following information is based on that journal article.

Research Findings:

- Glucosamine and chondroitin sulfate supplements reduced pain associated with osteoarthritis in all studies; they also reduced joint swelling and increased mobility, but only in a few studies
- There is not enough evidence at this time to suggest that glucosamine or chondroitin sulfate will change or reverse the progression of osteoarthritis. A few preliminary studies in animals and *in vitro* suggest that these supplements may have anti-inflammatory effects and may positively affect the structure of joints, but it is not clear whether these benefits would occur in humans.
- Studies suggested that 1500 mg of glucosamine sulfate or 800-1200 mg of chondroitin sulfate per day, in pill form, might be effective. There are no studies on other forms of these supplements (e.g., powder form) or on other dosages.
  - Only one study examined glucosamine hydrochloride (another type of the supplement). This study showed that 1500 mg of glucosamine hydrochloride seemed to reduce pain associated with osteoarthritis.
- No studies have examined the effectiveness or safety of using glucosamine and chondroitin sulfate in combination, although these dietary supplements are sometimes marketed and sold together. Therefore, the effectiveness and safety of using these two supplements in combination is currently not known.
- Researchers do not know the long-term effectiveness and safety of glucosamine or chondroitin sulfate, or whether they may interact with or interfere with other medications.

In 1999, the National Institutes of Health funded a 4-year study to determine the effectiveness and safety of glucosamine and chondroitin sulfate taken separately or together in reducing pain and improving mobility in patients with osteoarthritis of the knee(4). However, no data are currently available from that study.

Some Suggestions and Precautions:

- If you want to try these supplements, tell your physician or health care provider, especially if you are taking other medications.
- If you try these supplements, remember that 1500 mg of glucosamine sulfate or hydrochloride or 800-1200 mg of chondroitin sulfate per day in pill form are the only dosages and forms that have been scientifically tested.
- If you have not experienced pain relief in 2-4 months, it probably is not going to work for you(5).
- Some people should be especially careful in taking these supplements(5):
  - People with diabetes should check their blood sugar regularly; some animal research suggests that glucosamine could raise insulin resistance and hinder the uptake of sugar from the blood.
  - Regular users of anti-coagulants (e.g., aspirin, heparin) should be careful; chondroitin could alter blood-clotting activity, and act as a blood thinner similar to heparin.

  - People with allergies to shellfish may want to check with their physician before taking glucosamine. It is made from the shell of crab, lobster, and shrimp. If you are allergic to shellfish, you may want to be careful.
  - Pregnant women should avoid taking these supplements.
- **Dietary supplements are not regulated by the FDA, which means there is no standardization or guarantee that each pill will have the dosage of the active ingredient that is listed on the label.**
- Side effects may include mild gas, bloating, or diarrhea (5).
- It is important to monitor possible side effects of these supplements. Side effects should be reported to FDA MedWatch by calling 1-800-FDA-1088 or through the Internet http://www.fda.gov/medwatch/report/hcp.htm.

1. *Vital and Health Statistics: Current estimates from the National Health Interview Survey, 1993. USDHHS, National Center for Health Statistics (Series 10, No. 190), 1994.*
2. *Eisenberg DM, et al: Trends in alternative medicine use in the United States, 1990-1997: Results f a follow-up national survey. JAMA 290: 1569, 1998*
3. *Deal CL, Moskowitz RW: Nutraceuticals as therapeutic agents in osteoarthritis: Role of glucosamine, chondroitin sulfate, and collagen hydrolysate. Rheumatic Diseases Clinics of North America 25:379, 1999.*
4. *NIH News Release, September 15, 1999. NIH awards study on glucosamine/chondroitin sulfate for knee osteoarthritis. Retrieved from the Intertnet (http://www.nih.gov/niams/news/nccam-15.htm) on 2/8/2000.*
5. *Tuffs University Health & Nutrition Letter. A look at Glucosamine and Chondroitin for easing arthritis pain. January, 2000.*

Product Warnings!

Chinese Herbs in the Treatment of Diabetes

Consumers should immediately stop using five herbal products because they contain two prescription drugs listed as ingredients that are unsafe without being monitored by a physician, according to the State Health Director Diana Bonta, R.N., Dr.P.H.(DHS, 2000). The herbal products are commonly taken by those who have diabetes and are looking for alternative therapies to improve their blood sugar. The five products are:

- Diabetes Hypoglucose Capsules
- Pearl Hypoglycemic Capsules
- Tongyi Tang Diabetes Angel Pearl Hypoglycemic Capsules
- Tongyi Tang Diabetes Angel Hypoglycemic Capsules
- Zhen Qi Capsules

After some investigation from the California Department of Health Services' Food and Drug Branch, they found that these herbal products contain prescription drugs commonly known as **glyburide** and **phenformin**, which are used to treat diabetes. Taking these herbal remedies may put you at risk of an extremely dangerous dose of glyburide and phenformin which may result in low blood sugar. If you are currently taking any of these 5 herbal remedies, it is recommended to stop taking them and consult your physician.

Source: State Health Director Warns Consumers about Prescription Drugs in Herbal Products. Department of Health Services. Press Release, Feb. 15, 2000

St. John's Wort and Prescription Drug Interaction!

There has been recent evidence that St. John's Wort can interact with several prescription drugs. This herbal supplement can vary from bottle to bottle and pill to pill. St. John's Wort can induce the various drug-metabolizing enzymes which may result in a ***reduction*** in blood levels and the therapeutic effect of needed prescription medications. It is important to note that when patients stop taking a preparation containing St. John's Wort, blood levels of interacting medicines may rise resulting in toxicity (US Department of Health). The committee on Safety of Medicines suggests that St. John's Wort should not be used with the following medications:

- Indivanir
- Cyclosporin
- Digoxin
- HIV medications
- Warfarin
- Oral Contraceptives
- Theophylline
- Anticonvulsant

Patients that are taking these medications should not take St. John's Wort and should consult their physician. The bottom line is that ***St. John's Wort preparations are unlicensed herbal remedies and their level of active ingredients can vary from one preparation to another. If you are taking the above prescription medications, it may not be safe for you to take St. John's Wort.***

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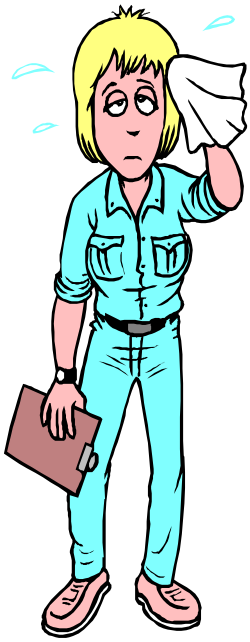
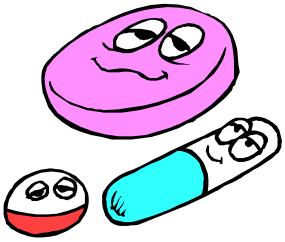
Product Warnings! (Con't)

FDA warning against Triax Metabolic Accelerator

The Food and Drug Administration is warning consumers not to purchase or consume the product Triax Metabolic Accelerator, containing the active ingredient tiratricol. This product is being marketed as a dietary supplement for weight-loss. The active ingredient in this product has an action similar to a thyroid hormone which may cause severe diarrhea, sweating, nausea, insomnia, nervousness and fatigue. It is recommended that you immediately stop taking this supplement. If you have any adverse effects from this supplement or any other product please report it to:



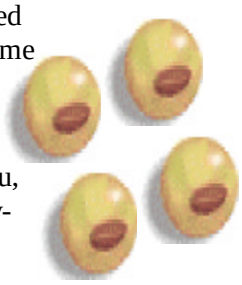
MedWATCH at 1-800-FDA-1088.



Soy Protein: FDA approves health claim for labeling

There is an established link between dietary soy and it's effect on reducing body's cholesterol levels. This in turn can reduce the risk of coronary heart disease. There are several studies demonstrating that elevated total low-density lipoprotein (LDL) cholesterol levels were decreased by 10-20% by those who consume soy products.

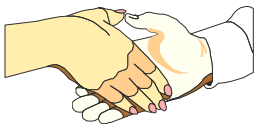
The foods eligible to make the dietary health claim include tofu, tempeh, soy beverages, and soy-based meat alternatives. These foods must meet certain requirements such as lowfat, low saturated fat, and low cholesterol. They must also contain at least 6.25 grams of soy protein per serving which is the daily amount shown in studies to have a beneficial effect in lowering cholesterol.



The following foods contain soy protein and the serving size necessary to attain the greatest benefit of consumption:

Foods	Serving Size	Serving Suggestion
Whole Soybeans	4 oz (1/2 cup cooked)	Soup, salad, stew dip, casserole
Roasted Soybeans	4 oz (1/2 cup cooked)	Crunchy peanut-like snack
Soymilk	8 oz (1 cup)	Use like cow's milk
Isolated soy protein	1 oz	Powder: add to recipes
Tofu	4 oz	Stir-fry, soup, casserole, shakes
Tempeh	4oz	Sauces, can be grilled-main dish

Source: Stein, Karen. FDA approves health claim labeling for foods containing soy protein. The American Dietetic Association. March 2000



Community Activities

National Nutrition Month 2000/Health & Nutrition Essay Contest Winners by Esther Ho, RD

Congratulations to five Orange County high school students whose essays are selected to be the award winning essays. It is always a pleasure to recognize young people who have taken time and effort to express their interest in health and nutrition. This year, seventy-eight Orange County high school students voiced their opinions on good health and nutrition through their critical thinking and exploration on reliable sources of information. We applaud all of them and wish them much success.

Each winning student will be awarded a U.S. savings bond and a gift certificate. The winning essays will be displayed at the County Hall of Administration Building during the month of June. We would like to thank all the sponsoring organizations for making this event an excellent educational opportunity for our students. We especially express our gratitude to the American Cancer Society and the Orange County Nutrition Council for sponsoring the awards, and thank all the judges who contributed their valuable time and professional expertise in reading the essay entries.

NUTRITION TIMES

The NUTRITION TIMES is published biannually by the Orange County Nutrition Alert Coalition of the County of Orange Health Care Agency, Nutrition Services Program. It is intended to keep the public and consumers informed on reliable nutrition information. The coalition is dedicated to the promotion of optimal health and nutrition through consumer education and awareness.

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Health & Nutrition ESSAY CONTEST Winners

The award winners of the 3rd Annual Health & Nutrition Essay Contest and the titles of their winning essays are:

First Place
Jennifer J. Kang, Troy High School
"Hunger in Orange County"

Second Place
Thang Pham, Westminster High School
"The Effect of Calcium on Osteoporosis"

Third Place
Christine Wood, Vineyard Christian School
"Sports and Herbal Supplements"

Honorable Mention
Elizabeth Onsrud, Edison High School
"Our Parents Were Right All Along!"

Chris Nixon, Edison High School
"Fruits and Vegetables Make a Healthy Diet"

In Next Issue

- Ergogenic Aids
- Sports Nutrition
- Nutrition Product Update